VMware SD-WAN Enables Managed WAN for Service Providers

The Move to the Cloud is Changing the Network

A private MPLS-based Wide Area Network (WAN) has been the cornerstone service that service providers have offered for enterprises to connect branch offices with their corporate data centers for the last decade. Service providers around the world have invested heavily in their MPLS network infrastructure to support their customers' demand. However, the branch networking landscape has changed recently with the ubiquitous availability of Internet broadband and widespread adoption of cloud services. According to Nemertes research, enterprises' adoption of Internet as a WAN is growing 25% annually.

Cloud-based applications drive enterprises to rely more heavily on Internet connectivity, and change the traditional traffic pattern from a branch-to-data center to a branch-to–cloud pattern. The legacy network design of traffic flow from the branch-to-data center causes inefficiencies that impact the performance of cloud applications, while driving up costs and complexities of enterprise networking. All of these changes are happening at a time when service providers are facing fierce competition that is adversely impacting the growth of MPLS deployment and the associated services.

As your customers seek better performance and agility from the network and as their applications move to the cloud, your service provider business needs to continue to evolve, adapt, and expand to meet your customers' needs. VMware SD-WAN™ by VeloCloud® enables service providers to increase network agility and deliver advanced services to increase revenue and acquire and retain customers. With VMware SD-WAN, service providers can deliver elastic transport, performance for cloud-hosted applications, and integrate advanced services using zero-touch deployment edge devices and a cloud-delivered management model.

Enterprises Demand More Bandwidth and Access to Cloud Services

Enterprises will benefit from a managed network service that allows them to consume cloud and rich media applications while maintaining the network performance to which they are accustomed. They are also increasingly aware of a hybrid WAN networking paradigm that allows them to combine both MPLS and Internet transport. Hybrid WAN has gained popularity in the last few years, but it is quite difficult to manage and operate due to its complexity. For the service provider, managing two disparate, disjointed networks built on MPLS and the Internet can be quite complex

"Service providers can transform MPLS networks to deliver managed hybrid WAN, enable direct access to cloud services and increase network agility."

DANIEL SIMMS
HEAD OF IT OPERATIONS
ADDLESHAW GODDARD

to configure, operate, and troubleshoot.

Service providers around the world are assessing how to transform their networks to meet the customer demands of:

• On-demand bandwidth without major network re-architecture
• Expanded WAN services to provide a direct, optimal path to Cloud services and enhanced application delivery
• A unified management and orchestration network model
• Seamless integration with existing network infrastructure
• Improved operational efficiency and reduction of total cost of ownership

Transforming the MPLS Network to a Service-Ready Network

VMware SD-WAN is a pioneer in branch networking with a solution that combines the economics and flexibility of multiple WAN transports with the deployment and agility of a cloud-based service. VMware SD-WAN provides a managed, cloud-ready solution for service providers looking to deliver a managed hybrid WAN with MPLS service. With VMware SD-WAN, policies can be defined in the VMware SD-WAN Orchestrator to provide application steering according to business requirements, policy and goveranance. By compining internet links with MPLS, coupled with a centralized policy controller, service providers can meet the demands for a unified, elastic bandwidth service.In addition to higher reliability, increased available bandwidth, and improved application performance for their end customers, service providers can easily operate and integrate this new architecture into their existing MPLS network. Managed Hybrid WAN can be the next generation WAN service that is easier to manage and deploy, that can be built on the foundation of a cloud-delivered SD-WAN.

The VMware SD-WAN Solution Enables New Services

VMware delivers a turnkey SD-WAN solution that enables service providers to deliver a Hybrid WAN with MPLS. The solution consists of multiple key components.

VMware SD-WAN Orchestrator

SD-WAN orchestration provides centralized policy management, monitoring, and troubleshooting as well as a scalable control plane. Its multitenant architecture enables operators to easily provision mutlitple customers and manage across customer environments. Each customer can be provided access to their own self-service Web portal for monitoring and policy configuration. Both the service provider and enterprise portals have granular role-based access. Its easy to use, intuitive Web interface enables operational efficiency with minimal training. VMware SD-WAN's application level policy framework provides a business level abstraction for how the network should steer application flows across different transports and to hybrid cloud destinations. Its API-driven architecture also means that service providers can easily integrate the VMware SD-WAN Orchestrator into their operations.

VMware SD-WAN Edge

The VMware SD-WAN Edge is available as a high-performance customer-premises edge (CPE) or virtual CPE (vCPE) that is designed to be easy to deploy, using a call home feature to get the configuration from the Orchestrator. These devices are available in a range of throughput performance tiers to suit any size of location. The virtual form factor supports major hypervisors including VMware, Xen, and KVM. The SD-WAN Edge supports multiple connectivity options including wired and wireless,

allowing for rapid deployment using the best available link choices. Once enabled, it automatically detects the circuit characteristics, such as bandwidth, latency and more. It then builds a secure overlay network with the SD-WAN gateways across all the available links and starts steering the applications per the configured policy. VMware SD-WAN Dynamic Multipath Optimization (DMPO) ensures superior application perforamnce by dynamically steering packets on the best available path and protects critical applications from sub-optimal performance of the underlying transport.

VMware SD-WAN Gateway

VMware SD-WAN Gateway is a multi-tenant virtual appliance that can be installed in the service provider core network or can be accessed from VMware hosted PoPs. It terminates the overlay tunnels from the VMware SD-WAN Edge coming over both private (MPLS) and public (Internet) links. Its multitenant architecture provides cost effective, scalable services for many customers. VMware SD-WAN Gateways scale horizontally in order to meet the scale and performance requirements of service providers. Working with the VMware SD-WAN Edge, the Gateway terminates DMPO so multiple, ordinary broadband and private links appear as a single, high-bandwidth link.

Easy Deployment, Configuration, and Management

The VMware SD-WAN devices can be quickly installed in the branch locations with zero-touch deployment. The branch Edge can be provisioned either as a virtual machine or as custom-hardware that is shipped to the branch office, where a non-technical person simply plugs in the power and a network connection. Activation, configuration, and on-going management are all done in the cloud from the VMware SD-WAN Orchestrator. The Edge device efficiently integrates private-MPLS circuits and ordinary broadband circuits like DSL, cable, fiber and wireless 4G-LTE connectivity options into a single, logical virtualized connection.

The VMware SD-WAN Edge delivers DMPO across the multiple links treating them as a single, high-bandwidth link. The VMware SD-WAN Orchestrator provides centralized configuration of the devices, real-time monitoring of network performance, and provisioning of application specific policies for handling traffic. The VMware SD-WAN Orchestrator business policy framework makes setting policy as simple as one click using application aware templates. Service providers can define business rules, such as prioritizing collaborative applications over social media, and the corresponding QoS mechanisms and resource allocations, including link/path steering, and error correction, which are automatically optimized. Flexible deployment options, like branch-to-branch to improve VoIP quality, are possible and easy to configure.

Integrated Security Services

VMware SD-WAN provides a number of security services. The VMware SD-WAN Edge has a built in firewall that can replace basic firewall appliances in branch office locations. A VNF infrastructure resides on the Edge device and can be used to host virtual services, including security services. The service chaining capability can be used to connect to cloud-hosted security services. A feature called Cloud VPN provides site-to-site virtual private network (VPN) capabilities to enable secure

connections between sites. The VPNs can be originated on a VMware SD-WAN Gateway and terminated on any capable device. Edge-to-gateway VPN tunnels are automatically provisioned. Legacy sites can be connected to the Cloud VPN via standard VPNC-compliant IPsec tunnels. This feature allows for sites that do not have an SD-WAN device to be connected and is especially useful for connecting data centers where the customer is not ready to change their existing architecture.

Performance is Critical

VMware SD-WAN boosts the service level of any type of link through unique technologies.

VMware Dynamic Multipath Optimization

With DMPO, packets are steered on a per-packet basis to the optimal link according to user-defined policies based on performance metrics, application requirements, business priority of the application, and the link cost. This technology can create a virtual, high bandwidth pipe from multiple links, including inexpensive broadband links, leased lines, and LTE, providing customers with improved WAN economics and quality of service.

Forward Error Correction

When real-time traffic (e.g., VOIP) with higher business priority is identified, on-demand forward error correction can be performed to reduce or eliminate packet loss. In tests on approximately six million anonymous data records, an Internet connection had performance issues that impacted voice quality (dropped segments of calls) about 25% of the time. A combination of packet steering and forward error correction reduced voice degradation to less than 1% of the time.

Real-time Analytics

A dashboard displays network and application performance. The information that it provides can be used for tuning business policies or circuit selection. For example, policies can be tuned to treat real-time interactive and bulk streams differently. The service classifies over 5,000 applications, which enables granular control for prioritization, optimal link steering and real-time remediation. The dashboard is multitenant and can be shared with customers to display performance metrics and demonstrate the value of the VMware SD-WAN service.

VMware SD-WAN Benefits

Service providers can continue to leverage their investment in their MPLS networks, while gradually and seamlessly integrating SD-WAN technology into their network. The multitenant architecture and centralized management of the SD-WAN solution enables service providers to quickly implement and operationalize a hybrid WAN with MPLS service. Service providers can quickly meet the customer demand and protect and augment their existing MPLS revenue. SD-WAN also lays a foundation for the service provider to transform their network to become an extensible, service-aware platform that supports their customers' adoption of cloud services and SaaS applications.

The branch office WAN is in transition as SD-WAN improves the economics and quality of WAN connections and makes access to the cloud easier and better performing. Along these lines, the SD-WAN solution offers enterprise-grade performance, security, visibility, and control over both Internet and private networks, combining the reliability of MPLS private networks with the flexibility and cost savings of the Internet. For more information visit the *VMware SD-WAN by VeloCloud* site.